

How Trade Liberalization Can Benefit the Environment (or The Fallacy of “Food Miles”)

Robert L. Thompson

Gardner Endowed Chair in Agricultural Policy

University of Illinois at Urbana-Champaign

12 May 2008

Outline

- Economic and environmental benefits of liberalizing trade
- The disarray in world agriculture
- Projected doubling of demand for food plus growing production of biofuels from food commodities
- The challenge of doubling or tripling world ag production in an economically efficient and environmentally sustainable way
- Sustainability will require high yields and the fraction of world food production traded to grow.

Globalization & the Environment

- Where per capita incomes are low, environmental protection tends to lag.
- High income people have the resources to place greater value on environmental amenities and pay for them.
- Trade can be a powerful engine of economic growth when accompanied by a positive investment climate.
- When accompanied by a pro-poor development strategy, trade can also contribute to poverty reduction.

Economic Benefits of Trade

- If everything cost the same to produce in every country or region, there would be no basis for trade.
- Trade increases each country's standard of living by obtaining goods that others can produce at lower cost in exchange for things it can produce relatively cheaper.
 - By lowering the cost of living, households' purchasing power stretches further.
 - Increases a country's GDP by employing its land, labor & capital where they are most productive.

Environmental Benefits of Trade

- Avoids environmental degradation that comes with attempting local self-sufficiency by over-exploiting a region's scarce or fragile natural resources, e.g.
 - Wind erosion
 - Drawing down aquifers
- Can reduce “carbon footprint” of products that can be produced in other countries at lower carbon-intensity, e.g.
 - Winter production in hot houses of products that can be produced at lower carbon footprint (inclusive of transport) in warmer places

World Agriculture in Disarray*

- Most high income countries subsidize their agriculture, distorting relative returns to producing various outputs & inducing larger production than would otherwise occur.
- Many low income countries' food policies turn the terms of trade against agriculture to keep urban food prices low, reducing farmers' incentive to invest; agriculture underperforms relative to its potential.
- Protectionist import policies and export subsidies further distort what is produced where.

*to paraphrase D. Gale Johnson's book World Agriculture in Disarray

Projected Population Growth

(U.N. medium projections, in millions)

• <u>Region</u>	<u>2007</u>	<u>2050</u>	
• World	6,671	9,191*	+ 38%
• High Income	1,223	1,245	+ 2%
• Low Income	5,448	7,946	+ 46%
• Africa	965	1,998	+107%
• Asia	4,030	5,266	+ 31%
• Latin America	572	769	+ 34%
• North America	339	445	+ 31%
• Europe	731	664	- 9%

*The UN Population Office's low and high projections of the world population in 2050 are 7.8 billion and 11.9 billion, respectively.

Dynamics of Food Demand Growth

- 1.1 billion people live on less than \$1/day; 854 million of them suffer under-nutrition or hunger.
- 2.7 billion people live on less than \$2/day; by \$2 per day, most hunger (calorie) problems solved.
- As their incomes rise from \$2 to \$10 per day, people eat more meat, poultry and dairy products, fruits, vegetables & edible oils, causing rapid growth in raw ag commodity demand.
- After about \$10 per day, people buy more processing, services, packaging, variety, and luxury forms, but not more raw ag commodities.

Huge Growth in Food Consumption Expected from Poverty Reduction

Country	Population	% < \$1/day	% < \$2/day
China	1318	9.9	34.9
India	1132	34.3	80.4
Indonesia	232	7.5	52.4
Brazil	189	7.5	21.2
Pakistan	169	17.0	73.6
Bangladesh	149	41.3	84.0
Nigeria	144	70.8	92.4
Philippines	85	14.8	43.0
Source: World Bank. World Development Indicators database, 2007.			

Projected World Food Demand

- World food demand could double between 2000 and 2050:
 - 50% increase from world population growth
 - all in developing countries
 - 50% increase from broad-based economic growth in low income countries
- In low income countries in 2000, there were 352 million people living in households with incomes above \$16,000 per year.
- The World Bank estimates that that number will rise to 2.1 billion by 2030.

The Land Constraint

- There is at most 12% more arable land available that isn't presently forested or subject to erosion or desertification – and degradation of many soils continues.
- Most additional soil available is in South America and Africa.
- Investments in adaptive agricultural research will be necessary to enable production on presently unusable land.
 - E.g. soybean expansion in Brazil's savanna.

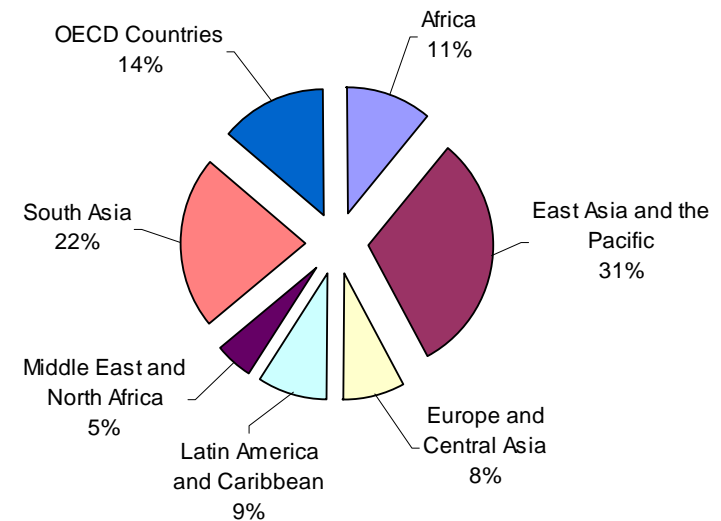
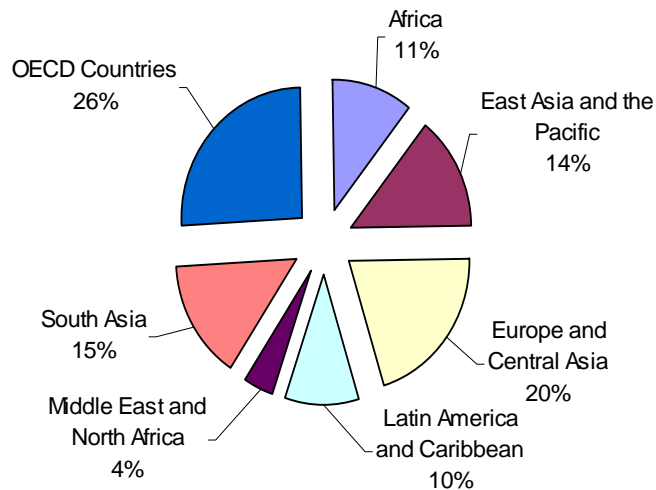
Keen Competition for Land among Food, Forests & Biofuels

- The same forces of population and income growth that increase demand for food also increase demand for things made out of wood, e.g. paper, furniture, building materials; poles.
- In rich countries, growing demand for environmental amenities and preservation of (especially old-growth) forested areas.
- Growth in production of biofuels from grains and oilseeds is creating yet more competition for land.

The Land Constraint (cont'd.)

- The area of land in farm production could be doubled, but only by massive destruction of forests and loss of wildlife habitat, biodiversity and carbon sequestration capacity
- The only environmentally sustainable alternative is to at least double productivity on the fertile, non-erodible soils already in crop production.
 - Again this will require larger public & private investments in adaptive agricultural research.

Because the World's Arable Land (left) Is Distributed Very Differently than its Population (right)...



sustainability will require the fraction that moves through world trade to grow.

Water A Growing Constraint

- Farmers use 70% of the fresh water used in the world.
- With rapid urbanization, cities will likely outbid farmers for available water.
- The world's farmers need to more than double food production using less water than today.
- Driest regions can import part of their food supply at much lower economic & environmental cost than trying to grow it.

Asia Likely to Import Larger Fraction of Its Food Supply

- Rapid growth in demand for food from population and income growth is outstripping environmentally sustainable production capacity.
- Most not presently forested arable land is already in ag production. Without destroying forests, there is little ag expansion potential.
- Most irrigation potential is already exploited, and in some areas the aquifers are being drawn down faster than recharge rate.
- Fertilizer application rates are high by international standards.

North Africa & Middle East Also Likely to be Larger Food Importer

- Cereal self-sufficiency has been achieved in places by supporting price at as much as 10 times the world market price is unsustainable due to draw down of aquifers
 - E.g. wheat in Saudi Arabia.

Other Regions

- Due to biofuels development, North America and Western Europe likely to be supply smaller fraction of world ag trade.
- South America and Eastern Europe likely to be larger suppliers.
- Sub-Saharan Africa has the potential to be a net exporter – if it makes the necessary investments in infrastructure, research and improves the policy environment in which their farmers operate.

Long-Run Prospects

- Public and private sector investments in agricultural research have increased productivity faster than demand growth, with resulting 150 year downward trend in real price of grains.
- Need to double world food production by 2050 using less water and little more land than today & also produce feedstocks for biofuels production.
- Without larger research investments and a more open international trading system, this will be difficult.

Thank you.